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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,307	07/29/2003	Toshiaki Yoshihara	1100.68223	6440
24978	7590	11/02/2005		
GREER, BURNS & CRAIN 300 S WACKER DR 25TH FLOOR CHICAGO, IL 60606			EXAMINER SCHECHTER, ANDREW M	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/629,307	YOSHIHARA ET AL.	
	Examiner	Art Unit	
	Andrew Schechter	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2005.
 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-8 and 10-12 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☒ Claim(s) 10-12 is/are allowed.
 6) ☒ Claim(s) 1 and 3-8 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☒ The drawing(s) filed on 29 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/22/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 29 July 2005 has been entered.

Response to Arguments

2. Applicant's arguments filed 29 July 2005 have been fully considered but they are not persuasive.

The applicant's amendment of the claims to recite an electric field strength of more than 5 V/ μm does not make the claims patentable for the reasons discussed below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Hasegawa et al.*, U.S. Patent No. 6,614,491.

Hasegawa discloses [see Figs. 1-3, for instance] a manufacturing method of a liquid crystal display device comprising two substrates [11, 31] sandwiching a liquid crystal [40] having spontaneous polarization; and electrodes [15, 34, etc.] formed on the substrates for applying a voltage to the liquid crystal, the liquid crystal showing a monostable state in which an average molecular axis of a director of liquid crystal molecules is aligned in a single direction when no voltage is applied [col. 5, lines 53-55, etc.]; said method comprising the steps of heating the liquid crystal [col. 5, lines 43-44, etc.]; and applying an electric field in a vicinity of a transition temperature from a higher temperature phase than chiral smectic C phase to the chiral smectic C phase in an alignment treatment which is performed to obtain the monostable state after heating [col. 5, lines 43-55; the cell gap and liquid crystal thickness is 2 μm , col. 9, line 39, and Fig. 3 shows 7-10 V being applied, so the electric field is 3.5-5 $\text{V}/\mu\text{m}$].

Hasegawa does not disclose that the electric field strength is more than 5 $\text{V}/\mu\text{m}$ as recited by the amended claim. However, the disclosed range of 3.5-5 $\text{V}/\mu\text{m}$ and the recited range of more than 5 $\text{V}/\mu\text{m}$ are close enough that those skilled in the art would have expected them to have the same properties, in which case a *prima facie* case of obviousness exists [see MPEP 2144.05]. The applicant's specification does not appear to have any suggestion of criticality or unexpected results relating to the range "more than 5 $\text{V}/\mu\text{m}$ ", so there does not appear so far to be a rebuttal to this *prima facie* case of

obviousness in the record [again, see MPEP 2144.05]. Claim 1 is therefore unpatentable.

A temperature range of the vicinity of the transition temperature includes a temperature range of $\pm 2^{\circ}\text{C}$ from the transition temperature, so claim 3 is also unpatentable.

Considering the additional limitations of claim 8, *Hasegawa* also discloses a pixel substrate [11] with pixel electrodes [15], a common substrate [31] with common electrode [34], data lines [16], switching elements [18], scanning lines [12], and applying a control voltage [-20V, for instance] for controlling the state of said switching elements to said scanning lines and applying a different DC voltage [see Fig. 3] to said data lines and said common electrodes in a vicinity of a transition temperature as recited; and the electric field strength applied to the liquid crystal by the voltage difference between the data lines and common electrodes being more than $5 \text{ V}/\mu\text{m}$ is obvious to one of ordinary skill in the art at the time of the invention as discussed above. Claim 8 is therefore unpatentable as well.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Hasegawa et al.*, U.S. Patent No. 6,614,491 as applied above, in view of *Miura et al.*, U.S. Patent No. 6,703,993.

Hasegawa does not disclose necessarily disclose a backlight driven by a field-sequential color scheme, with data-writing and data-erasure scanning voltages. *Miura* does disclose [see Fig. 8 and discussion thereof, etc.] a backlight driven by a field-sequential color scheme, with data-writing and data-erasure scanning voltages. It

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would have been obvious to one of ordinary skill in the art at the time of the invention to use these in the method of *Hasegawa*, motivated by the desire for a high resolution display and *Miura*'s teaching that doing so allows a full-color image to be effectively displayed without undesired influence from the preceding frame period, thus improving the display image qualities [see col. 6, lines 34-60, for instance]. Claim 7 is therefore unpatentable.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Hasegawa et al.*, U.S. Patent No. 6,614,491 as applied above, in view of *Wingen et al.*, U.S. Patent No. 6,605,323.

Hasegawa discloses [col. 9, lines 13-15] a liquid crystal with a phase sequence (from high to low temperature) of isotropic liquid phase – nematic phase – chiral smectic C phase, or I–N–smectic C*, where (*) indicates chiral. Claim 4 recites either I–N*–smectic C* or I–N*–smectic A–smectic C*. (Note that chiral nematic and cholesteric are both N*, being interchangeable terms for this purpose.) *Hasegawa* therefore discloses a different phase sequence than those recited, in particular disclosing N rather than N*.

Wingen discloses an analogous LCD with liquid crystal having spontaneous polarization, and discloses that the phase sequence preferably comprises “isotropic – nematic or cholesteric (N*) – smectic C*” [col. 4, line 45]. This is evidence that the liquid crystals with the sequence I–N–smectic C* are art recognized equivalents to those with the sequence I–N*–smectic C*. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use a liquid crystal with phase sequence I–

N*-smectic C* rather than I-N-smectic C* in *Hasegawa's* method, motivated by the art-recognized equivalency of the two. Claim 4 is therefore unpatentable.

7. Claims 1 and 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Jones*, U.S. Patent No. 6,307,610 in view of *Jones*, U.S. Patent No. 6,307,610.

Jones discloses [see Fig. 2, etc.] a manufacturing method of a liquid crystal display device comprising two substrates sandwiching a liquid crystal having spontaneous polarization; and electrodes [5, 6], formed on the substrates, for applying a voltage to the liquid crystal, the liquid crystal showing a monostable state in which an average molecular axis of a director of liquid crystal molecules is aligned in a single direction when no voltage is applied, said method comprising the steps of: heating the liquid crystal [col. 5, line 64ff.]; and applying an electric field in a vicinity of a transition temperature from a higher temperature phase than chiral smectic C phase to the chiral smectic C phase in an alignment treatment which is performed to obtain the monostable state after heating [col. 6, lines 1-8, abstract, etc.].

Jones does not explicitly disclose the remaining limitation of claim 1, that the electric field strength is more than 5 V/ μ m. *Jones* discloses using an AC voltage typically between 0.5 V and 5.0 V [col. 6, line 5] and a liquid crystal thickness about 1-6 μ m [col. 4, line 66], which corresponds to a range of electric field strengths from about 0.1 V/ μ m to about 5 V/ μ m. As above, this range and the recited range are close enough that those skilled in the art would have expected them to have the same properties, so a *prima facie* case of obviousness exists which has not been rebutted by evidence of criticality or unexpected results [see MPEP 2144.05]. Furthermore, *Jones*

teaches [col. 10, lines 48-53] that applying 0 V gave 20% of the desired texture, 0.5 V gave 60%, and 2 V gave nearly 100%. This constitutes a teaching that increasing the applied voltage (and hence increasing electric field strength) is desirable in that it tends to produce more of the desired liquid crystal texture. The electric field strength is therefore a result-effective variable whose optimization would have been obvious to one of ordinary skill in the art at the time of the invention; it would therefore have been obvious to one of ordinary skill in the art at the time of the invention to use an electric field strength in the method of *Jones* which is more than 5 V/ μm . Claim 1 is therefore unpatentable.

A temperature range of the vicinity of the transition temperature includes a temperature range of $\pm 2^\circ\text{C}$ from the transition temperature, so claim 3 is also unpatentable. The liquid crystal shows a phase sequence of isotropic – cholesteric – smectic A – chiral smectic C [see col. 1, lines 19-23], so claim 4 is also unpatentable. There are alignment films formed on the two substrates wherein rubbing directions of the alignment films are equal to each other [col. 5, lines 18-31], so claim 5 is also unpatentable. A pretilt angle of the alignment films is not more than 2° [$\xi \sim 1.5^\circ$, col. 10, lines 58-60, etc.], so claim 6 is also unpatentable.

Allowable Subject Matter

8. Claims 10-12 are allowed.
9. The following is a statement of reasons for the indication of allowable subject matter:

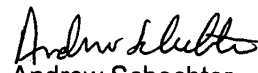
The prior art does not disclose the device of claim 10, in particular the additional limitation that the control voltage for turning on the switching elements and the DC voltage are at equal potential. Claim 10 is therefore allowed, along with dependent claims 11 and 12.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Andrew Schechter
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29 October 2005